IN THE CLAIMS:

1. (currently amended) A quartz crystal tuning fork ~~resonator, capable~~ resonator capable of vibrating in a flexural mode, the quartz crystal tuning fork resonator comprising:

a plurality of quartz crystal tuning fork tines for undergoing vibration in an inverse phase, each of the quartz crystal tuning fork ~~tine~~ tines having ~~sides and~~ a first main surface and a second main surface opposite the first main surface, each of the first and second main surfaces having a central linear portion;

a quartz crystal tuning fork ~~base, to~~ base to which the ~~plurality of~~ quartz crystal tuning fork tines are attached;and

at least one groove ~~provided~~ formed in the central linear portion of each of the first and second main surfaces ~~each of the plurality~~ of each of the quartz crystal tuning fork ~~tines,~~ tines, a width of the groove in the central linear portion of one of the first and second main surfaces of each of the quartz crystal tuning fork tines being greater than or equal to a distance in the width direction of the groove measured from an outer edge of the groove to an outer edge of the tuning fork tine.

~~at least one first electrode provided inside each groove; and~~

~~at least one second electrode provided on the sides of the tuning fork tines;~~

~~such that for each tuning fork tine each one of the at least one second electrode has an opposite electrical polarity to the electrical polarity of each one of the at least one first electrode.~~

2. - 9. (canceled)

10. (currently amended) A quartz crystal tuning fork ~~resonator, capable of vibrating~~ resonator capable of vibrating in a flexural mode, the quartz crystal tuning form comprising: ~~comprising;~~

a plurality of quartz crystal tuning fork tines each having a plurality of stepped portions;

a quartz crystal tuning fork ~~base, to~~ base to which the ~~plurality of~~ quartz crystal tuning fork tines are attached; ~~each of the quartz crystal tuning fork tines having step difference portions;~~

~~with there being~~ at least one first electrode disposed on each of two of the ~~step difference portions;~~ stepped portions of each of the quartz crystal tuning fork tines; and

~~with there being~~ at least one second electrode disposed on a side ~~sides~~ of each of the quartz crystal tuning fork tines, the second electrode of each of the quartz crystal tuning fork tines having an electrical polarity opposite to an

electrical polarity of the first electrode of each of the quartz crystal tuning fork tines. ~~and;~~

~~such that the at least one first electrode and the at least one second electrode are of opposite electrical polarity.~~

11. - 26. (canceled)

27. (currently amended) An integrated quartz crystal tuning fork ~~resonator, capable of vibrating~~ resonator for undergoing vibration in a flexural mode, the integrated quartz crystal tuning fork comprising:

a plurality of individual quartz crystal tuning fork ~~resonators, each~~ resonators each capable of vibrating in a flexural mode, the plurality of individual quartz crystal tuning fork resonators being selected from the group consisting of:

~~A.)~~ (A) a quartz crystal tuning fork ~~resonator, capable of vibrating in a flexural mode, comprising:~~ resonator having a plurality of quartz crystal tuning fork ~~tines, each tuning fork tine~~ tines each having sides and a central linear ~~portion; a quartz~~ portion, a quartz crystal tuning fork ~~base, to~~ base to which the ~~plurality of~~ quartz crystal tuning fork tines are ~~attached; at~~ attached, at least one groove formed ~~provided~~ in the central linear portion of each of the ~~plurality of~~ quartz crystal tuning fork ~~tines; at~~ tines, at least one first electrode disposed in the at least one groove

of each of the quartz crystal tuning fork tines, and at ~~provided inside each groove; and at~~ least one second electrode disposed on a side of each of the quartz crystal tuning fork tines, the second electrode of each of the quartz crystal tuning fork tines having an electrical polarity opposite to an electrical polarity of the first electrode of each of the quartz crystal tuning fork tines ~~provided on the sides of the tuning fork tines; such that for each tuning fork tine each one of the at least one second electrode has an opposite electrical polarity to the electrical polarity of each one of the at least one first electrode~~;

~~B.)~~ (B) a quartz crystal tuning fork ~~resonator, capable of vibrating in a flexural mode, comprising: a~~ resonator having a plurality of quartz crystal tuning fork ~~tines; a~~ tines, a quartz crystal tuning fork ~~base, having~~ base ~~an obverse face and a reverse face, and~~ to which the ~~plurality of~~ quartz crystal tuning fork tines are ~~attached; a~~ attached, a plurality of grooves formed in ~~provided on~~ the quartz crystal tuning fork base, and ~~where the plurality of quartz crystal tuning fork tines are attached to the quartz crystal tuning fork base; and a plurality of electrodes~~ at least one electrode disposed ~~provided~~ in each of the ~~grooves, such that there is at least one electrode in each groove;~~ grooves;

~~C.)~~ (C) a quartz crystal tuning fork ~~resonator, capable of vibrating in a flexural mode, comprising; a~~ resonator having a plurality of quartz crystal tuning fork

~~tines; a~~ tines each having a plurality of stepped portions, a quartz crystal tuning fork ~~base, to~~ base to which the ~~plurality of~~ quartz crystal tuning fork tines are ~~attached, each of the quartz crystal tuning fork tines having step difference portions; with there being~~ attached, at least one first electrode disposed on each of two of the stepped portions of each of the quartz crystal tuning fork tines ~~the step difference portions; with there being~~ portions, at least one second electrode disposed on a side of each ~~sides~~ of the quartz crystal tuning fork tines, the second electrode of each of the quartz crystal tuning fork tines having an electrical polarity opposite to an electrical polarity of the first electrode of each of the quartz crystal tuning fork tines; ~~and; such that the at least one first electrode and the at least one second electrode are of opposite electrical polarity;~~ and

~~D.)~~ (D) a combination of individual resonators according to at least two of ~~A, B, and C.~~ (A), (B) and (C).

28. - 38. (canceled)

39. (new) A quartz crystal tuning fork resonator according to claim 1; wherein the plurality of quartz crystal tuning fork tines comprises a first quartz crystal tuning fork tine and a second quartz crystal tuning fork tine; and wherein the grooves in the first and second main surfaces of each of the first and second quartz crystal tuning fork tines are

disposed opposite each other in a thickness direction of the first and second quartz crystal tuning fork tines.

40. (new) A quartz crystal tuning fork resonator according to claim 39; wherein each of the first and second quartz crystal tuning fork tines has side surfaces; and further comprising a plurality of first electrodes each disposed in a respective groove of the first and second quartz crystal tuning fork tines, and a plurality of second electrodes each disposed on a respective side surface of each of the first and second quartz crystal tuning fork tines, the second electrodes of each of the first and second quartz crystal tuning fork tines having an electrical polarity opposite to an electrical polarity of the first electrodes of each of the quartz crystal tuning fork tines.

41. (new) A quartz crystal tuning fork resonator according to claim 40; wherein the first electrode disposed in one of the grooves of the first quartz crystal tuning fork tine is connected to the second electrode disposed on one of the side surfaces of the second quartz crystal tuning fork tine such that the first electrode of the first quartz crystal tuning fork tine and the second electrode of the second quartz crystal tuning fork tine define a first electrode terminal; and wherein the second electrode disposed on one of the side surfaces of the first quartz crystal tuning fork tine is connected to the first electrode disposed in one of the

grooves of the second quartz crystal tuning form tine such that the second electrode of the first quartz crystal tuning fork tine and the first electrode of the second quartz crystal tuning fork tine define a second electrode terminal.

42. (new) A quartz crystal tuning fork resonator according to claim 41; wherein two of the side surfaces of each of the first and second quartz crystal tuning fork tines comprises an inner side surface and an outer side surface opposite the inner side surface; wherein when a direct current voltage is applied between the first and second electrode terminals, a direction of an inner electric field generated between the second electrode disposed on the inner side of the first quartz crystal tuning fork tine and the first electrode disposed in one of the grooves opposite to the second electrode disposed on the inner side of the first quartz crystal tuning fork tine is the same as a direction of an inner electric field generated between the second electrode disposed on the inner side of the second quartz crystal tuning fork tine and the first electrode disposed in one of the grooves opposite to the second electrode disposed on the inner side of the second quartz crystal tuning fork tine, and a direction of an outer electric field generated between a second electrode disposed on the outer side of the first tuning quartz crystal fork tine and the first electrode disposed in one of the grooves opposite to the second electrode disposed on the outer side of the first quartz

crystal tuning fork tine is the same as a direction of an outer electric field generated between the second electrode disposed on the outer side of the second quartz crystal tuning fork tine and the first electrode disposed in one of the grooves opposite to the second electrode disposed on the outer side of the second quartz crystal tuning fork tine, the direction of each of the inner electric fields being opposite to the direction of each of the outer electric fields.

43. (new) A quartz crystal tuning fork resonator according to claim 42; wherein the directions of the inner and outer electric fields of the first and second quartz crystal tuning fork tines are generally along an x-axis direction of the quartz crystal tuning form resonator.

44. (new) A quartz crystal tuning fork resonator according to claim 43; wherein no electric field is generated between first electrodes disposed in opposite grooves of the first and second quartz crystal tuning fork tines when the direct current voltage is applied between the first and second electrode terminals.

45. (new) A quartz crystal tuning fork resonator according to claim 44; wherein the inner and outer sides of the first and second quartz crystal tuning fork tines undergo simultaneous deformation in opposite directions along a longitudinal axis of the first and second quartz crystal tuning fork tines.

46. (new) A quartz crystal tuning fork resonator according to claim 45; wherein when an alternating current voltage is applied between the first and second electrode terminals, the first and second quartz crystal tuning fork undergo vibration in a flexural mode of an inverse phase.

47. (new) A quartz crystal tuning fork resonator according to claim 10; wherein the quartz crystal tuning fork tines comprise first and second quartz crystal tuning fork tines each having a first main surface and a second main surface opposite the first main surface, each of the first and second main surfaces having one of the two stepped portions; wherein the first electrodes disposed in the two stepped portions of the first quartz crystal tuning fork tine are connected to the second electrode disposed on the side of the second quartz crystal tuning fork tine to define a first electrode terminal; and wherein the second electrode disposed on the side of the first quartz crystal tuning fork tine is connected to the first electrodes disposed in the two stepped portions of the second quartz crystal tuning fork tine to define a second electrode terminal.

48. (new) A quartz crystal tuning fork resonator according to claim 47; wherein each of the first and second main surfaces of each of the first and second quartz crystal tuning fork tines has a central linear portion; and wherein the two stepped portions corresponding to the first and second

main surfaces of each of the first and second quartz crystal tuning fork tines are disposed on opposite sides of the central linear portion.

49. (new) A quartz crystal tuning fork resonator according to claim 48; wherein when an alternating current voltage is applied between the first and second electrode terminals, the first and second quartz crystal tuning fork undergo vibration in a flexural mode of an inverse phase.

50. (new) A quartz crystal tuning fork resonator according to claim 27; wherein each of the plurality of individual resonators is connected to at least one other individual resonator of the plurality of resonators through a base portion.

51. (new) A quartz crystal tuning fork resonator according to claim 27; wherein each of the individual quartz crystal tuning fork resonators differs from another of the individual quartz crystal tuning fork resonators at least in one of the shape thereof and the configuration of the electrodes.

52. (new) A quartz crystal tuning fork resonator according to claim 27; wherein the individual quartz crystal tuning fork resonators are electrically connected together in parallel.

53. (new) A quartz crystal tuning fork resonator comprising:

a quartz crystal tuning fork base;

a plurality of quartz crystal tuning fork tines extending from the quartz crystal tuning fork base so that portions of the quartz crystal tuning fork base and portions of the quartz crystal tuning fork tines define opposite first and second main surfaces of the quartz crystal tuning fork resonator;

a first set of grooves formed in the first and second main surfaces of the quartz crystal tuning fork resonator;

a second set of grooves formed in the first and second main surfaces of the quartz crystal tuning fork resonator; and

a third set of grooves formed in the first and second main surfaces of the quartz crystal tuning fork resonator and between the first and second set of grooves.

54. (new) A quartz crystal tuning fork resonator according to claim 53; further comprising a first set of electrodes having the same polarity and each disposed in a respective one of the first set of grooves; and a second set of electrodes having the same polarity and each disposed in a respective one of the second set of grooves.

55. (new) A quartz crystal tuning fork resonator according to claim 54; wherein the polarity of the first set of electrodes is different from the polarity of the second set of electrodes.

56. (new) A quartz crystal tuning fork resonator according to claim 54; wherein the third set of grooves comprises a first pair of intermediate grooves each formed on a respective one of the first and second main surfaces and a second a second pair of intermediate grooves each formed on a respective one of the first and second main surfaces.

57. (new) A quartz crystal tuning fork resonator according to claim 56; further comprising a third set of electrodes having the same polarity and each disposed in a respective one of the first pair of intermediate grooves; and a fourth set of electrodes having the same polarity and each disposed in a respective one of the second pair of intermediate grooves.

58. (new) A quartz crystal tuning fork resonator according to claim 57; wherein portions of the quartz crystal tuning fork base and portions of the quartz crystal tuning fork tines define opposite first and second side surfaces of the quartz crystal tuning fork resonator; and further comprising a fifth electrode disposed on the first side surface and a sixth electrode disposed on the second side

surface and having a different polarity than the fifth electrode.

59. (new) A quartz crystal tuning fork resonator according to claim 58; wherein the second and fourth sets of electrodes and the fifth electrode have the same polarity; and wherein the first and third sets of electrodes and the sixth electrode have the same polarity.

60. (new) A quartz crystal tuning fork resonator according to claim 59; wherein the quartz crystal tuning fork resonator is symmetrical about a central plane thereof.